



FAQs: Green Chemistry Initiative

What is green chemistry?

Green chemistry is the process for reducing or eliminating the use of hazardous materials altogether. For the last century, environmental protection has concentrated on capturing and storing hazardous waste. Green chemistry is a fundamentally new approach to environmental protection, transitioning away from managing toxic chemicals at the end of the lifecycle, to reducing or eliminating their use altogether.

When implementing green chemistry, those designing consumer products and determining manufacturing processes consider the public health and environmental effects of those products at the design phase. Green chemistry practitioners design new products and processes that reduce or eliminate the use or generation of hazardous substances in several phases: 1) when companies manufacture the products; 2) when consumers use the products; and 3) when the products (and their packaging) are disposed.

FOR EXAMPLE:

Columbia Forest Products completely eliminated urea-formaldehyde resins in veneer-core hardwood plywood by substituting a soy-based product.

Result: the company's switch

- avoids the need to address formaldehyde pollution
- reduces the adverse health effects from formaldehyde on workers and the community

Why do we need green chemistry?

With approximately 100,000 different known toxic chemicals used in production today, a comprehensive approach is needed to reduce and eliminate these chemicals. Green chemistry is long-term environmental protection. It promotes public health and helps protect our environment for generations to come. Green chemistry encourages cleaner and less-polluting industrial processes, and ensures that manufacturers take greater responsibility for the products they produce.

FOR EXAMPLE:

Consumers and others do not have information about what toxic chemicals are in the products they use; nor do they have complete information about the possible negative effects of those chemicals.

The Department of Toxic Substances Control has tested a variety of consumer products in its Environmental Chemistry Laboratory, including:

- A child's necklace, labeled "nickel and lead free," was found to have 9,239 parts per million lead—which exceeds hazardous waste criteria.

- o A child's lunchbox was analyzed and found to contain 912 ppm lead and 172 ppm of cadmium—another toxic metal.

These are just two examples of ordinary consumer products that contain toxic materials—either as an intended ingredient or just a toxic substance “along for the ride.”

What is the California Environmental Protection Agency (Cal/EPA) Green Chemistry Initiative?

The Cal/EPA Green Chemistry Initiative is a collaborative approach for identifying options to significantly reduce the impacts of toxic chemicals on public health and the environment.

The Green Chemistry Initiative will provide recommendations for developing a consistent means for evaluating risk, reducing exposure, encouraging less-toxic industrial processes, and identifying safer, non-chemical alternatives.

Most importantly, the Green Chemistry Initiative will ensure a comprehensive and collaborative approach, to increase accountability and effectiveness of environmental programs across state government.

Why does California need a comprehensive approach to toxic chemicals?

The California Environmental Protection Agency (CalEPA) is initiating the Green Chemistry Initiative to take a comprehensive look at chemical policy for California. Over the past several years a handful of chemical bills each year have been signed into law addressing a small piece of chemical policy (i.e, PBDE ban, cosmetic regulation, lead in candy, and lead in pipes). Internally, the CalEPA's departments have also been dealing with chemical policy decisions one by one (ie, regulations, variances, studies). This chemical-by-chemical, product-by-product approach and even now city-by-city (ie. San Francisco) is leading to a patchwork quilt of chemical regulation. A comprehensive and unified approach is needed to ensure accountability and effectiveness.

What are the economic benefits of green chemistry?

Green chemistry, at its very core, is about designing products and processes to reduce or eliminate the need to manage and control waste at the end of the cycle. In addition, the Green Chemistry Initiative will promote better coordination of laws intended to manage single chemicals, creating a comprehensive system to ensure accountability and effectiveness. Many companies that are already using green chemistry principles are recognizing the economic benefits.

FOR EXAMPLE:

Avalon Organics in Petaluma reformulated their products to

- eliminate chemicals banned in Europe
- avoid other chemicals of concern
- eliminate petroleum-based ingredients

Results:

- the company ranks first in health food cosmetics, with growth exceeding market sector growth rate by 37% to 300% in various product areas.

Interface Fabric (one facility in the City of Industry) developed new interior fabrics from a corn-based biopolymer. A new protocol was established to screen out dyes and other substances typically used that are persistent, bioaccumulative and/or toxic.

Results: The biopolymer exhibits superior performance in terms of stain resistance, flame retardancy, and reduced odors. The substitution resulted in reductions of:

- water and fuel used
- greenhouse gas emissions.

Interface Fabric saved \$300,000 annually because of consolidation of chemical suppliers to vendors who meet their protocol.

SC Johnson Company's Greenlist™ originally focused on five key categories of ingredients: surfactants, propellants, home storage resins, insecticides and solvents. Today, it covers 15 categories of materials, including: packaging, chelates and sequestering agents, antimicrobials/preservatives, fragrance, candle waxes/fuel, non-woven/fabrics and organic/inorganic acids and bases.

Results: Since 2001, SC Johnson has eliminated more than 11 million kg of hazardous chemicals and removed more than 10 million pounds of volatile organic compounds from its environmental footprint - and continues to remove about 2.6 million more each year.

Specifics:

- phased out chlorine-based external packaging materials worldwide in December 2002
- phased out bottles made of polyvinyl chloride (PVC) eliminating use of 1,300 metric tons of PVC.
- phased out more than 50 metric tons of chlorine bleached paperboard.
- reduced hydrocarbon propellant by 16 percent in key aerosol brands (eliminated 2.8 million pounds of VOCs).
- reformulated the Saran™ Original plastic wrap formula that eliminated 1.8 million kg of PVDC
- surpassed the California Air Resources Board's requirements by using a non-VOC solvent in one of our leading insect control brands.
- reduced VOCs twice in two years in one of our top home cleaning formulas (eliminating 2 million pounds of VOCs while improving the product's effectiveness by 30 percent).

Ford Motor Corporation's "eco-effective" stormwater pollution prevention approach cleans the water and the air, provides habitat, and enhances the beauty of the landscape.

Result: savings of as much as \$35 million, by one estimation.

How does the green chemistry differ from traditional efforts to reduce pollution?

The 20th century approach to environmental protection focused on pollution — air emissions, the discharges of contaminants to surface and groundwater, and the generation of solid and hazardous wastes. While “pollution prevention” programs focus on reducing pollutants at the source, many of them do not focus enough on the design issues that are the focus of “green chemistry.”

The Cal/EPA Green Chemistry Initiative will explore such issues as:

- The toxicity of chemicals found in products, processes and commerce
- The physical and chemical properties of chemicals, including their potential to leach or migrate from wherever they may be found
- The fate and transport of chemicals in the environment, and the health and environmental risks
- The economic and technical impacts of chemical and non-chemical alternatives to toxic chemicals, and their health and environmental risks
- Identifying areas where investment in research and development is needed
- Identifying innovative technologies or alternatives
- Where chemical use restrictions may be warranted

FOR EXAMPLE:

California companies that implemented source reduction strategies reduced their hazardous waste generation by 11 percent. More than 64,000 tons of hazardous waste were avoided, eliminating the cost for managing those wastes. Workers and community members were protected from adverse effects of exposure to those hazardous substances.

What is the goal of the Green Chemistry Initiative?

The goal of the Green Chemistry Initiative is to develop policy options for implementing green chemistry policies. To accomplish this, the Cal/EPA Green Chemistry Initiative will do the following: 1) Define the challenges we face, 2) solicit input from all, 3) identify options for addressing each challenge, and 4) develop recommendations for action.

The Initiative will be accomplished through a transparent process, with stakeholder involvement. Communication will be facilitated through workshops, symposia and conferences, stakeholder meetings, web site communications, and consultation with universities, other governments and U. S. EPA.

The Initiative will utilize the expertise of various state agencies, including staff from Cal/EPA's boards, departments, and offices, as well as staff from the State and

Consumer Services Agency and the departments of Public Health, Conservation, and Industrial Relations.

Why is DTSC leading this effort?

Cal/EPA Secretary Linda Adams has asked Department of Toxic Substances Control (DTSC) Director Maureen Gorsen to lead a team effort to develop the Green Chemistry Initiative. DTSC will collaborate with Cal/EPA departments, other state agencies (DPH, DIR, DOC, CDFA and others) as well as other states, and federal and foreign governments, like Canada and the EU.

DTSC is well-suited for leading Cal/EPA's Green Chemistry Initiative (GCI). DTSC has demonstrated leadership in pollution prevention, is experienced in multi-agency initiatives, and has well-developed communication and public participation capabilities.